Data Definition Guide

Pre-Disaster Mitigation - Information and Condition of Schools (ICOS)

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DATA DEFINITION GUIDE

Pre-Disaster Mitigation
Information and Condition of Schools (ICOS)

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I. Background

The Office of Superintendent of Public Instruction (OSPI) was awarded a pre-disaster mitigation planning grant by Federal Emergency Management Agency (FEMA). The Pre-Disaster Mitigation program provides funds to states, territories, Indian tribal governments, communities, and universities for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event. Funding these plans and projects reduces overall risks to the population and structures while also reducing reliance on funding from actual disaster declarations.

The grant requires a planning process that will take place over the course of three years and involve high-level interaction with multiple school districts and other stakeholders in education. The final work product, a pre-disaster mitigation plan addressing school facilities in Washington State, will help identify and describe risks from natural hazards that face school buildings as well as tools and Federal funding programs to address those risks.

II. Project Description

OSPI and the State school districts will improve the understanding of risks from natural hazards to our state’s students, teachers, school facilities, and other occupants by undertaking natural hazard identification for school facilities. Based on the findings and input from a stakeholder planning team, a statewide plan will be developed to provide tools for school districts that face risks from natural hazards. The data in this part of ICOS addresses the six major natural hazards: Earthquake, Flood, Tsunami, Wildland/Urban Interface Fire, Lahar and Landslide. There are three additional FEMA hazards: drought, high winds, and severe storms; however we will not include these hazards in the analysis because there is no useful data specific to the building level.

Twenty-five to thirty-five school districts will be involved in the project as planning partners and will annex the statewide plan to create their own pre-disaster mitigation plans. Specific mitigation projects (from the planning partners) will be prioritized, and ten of those projects will go through a benefit-cost analysis, a necessary step for FEMA mitigation project applications. The annexes and the benefit-cost analyses will be included in the final statewide plan.
III. Pre-Disaster Mitigation Data within ICOS

The hazard and risk data entered in the Pre-Disaster Mitigation part of ICOS will serve a dual purpose:

- Support the hazard and risk assessments for the planning partner districts involved in the OSPI mitigation planning effort.
- Begin the process of evaluating the risks posed by natural hazards for all districts statewide.

The data populated from existing data bases and the data entered by school districts are necessary to begin the risk assessment process for schools – to determine which campuses or specific buildings on campuses may have a high enough level of risk to make mitigation measures to reduce risks a priority. These data will also help support future applications for FEMA mitigation grant funding.

The data in the grayed-out fields were populated from existing databases from the United States Geological Survey, FEMA, Washington Department of Natural Resources and others. These gray boxes cannot be edited. The white boxes are editable by the Districts.
IV. Screen Field Data Definitions

A. Summary Screen

The first screen displayed after logging into the ICOS system is the Home page. This screen displays the navigation tool bar with the various items the user can choose to open. Click on the ‘Inventory and Condition’ on the tool bar, which takes you into the District Summary screen. Then click on ‘Pre-Disaster Mitigation’ to view your District and Facilities. Click on a Facility to view the Facility PDM Summary screen.

The Summary screen displays the Statewide GIS identified hazards for the Facility within your District. It is required to have all of the data completed for the Statewide identified hazard screens. The District may also have concerns about the other hazards for the Facility and decide to select those optional hazards to add data. For example, a Facility is not within the identified FEMA-mapped floodplains, but may have repetitive flooding from local storm water drainage problems. (See Pre-Disaster Mitigation User Manual for step-by-step instructions.)

Once an optional hazard has been added to the Facility, all of the data for that screen will not be required in order to consider the Facility completed. (The District-identified optional hazards can be removed from a Facility if it is later determined not to be a hazard.)

To begin entering data, click on one of the Hazards listed on the Summary screen. The following will give an explanation and definition for every data field in each hazard screen.
B. Buildings Screen

1. Total Gross Building Square Feet
Definition: The total square feet entered into the Gross Building Sq Ft column for each area use row in the Building Inventory Edit screen for the building in the District Summary section of ICOS.

This field cannot be edited in the PDM screen; it can only be edited in the Building Inventory Edit screen.

If there is no square feet added in the Building Inventory screen, a message in red text will appear saying “Go to Building Inventory to add Building Sq Ft”.

2. Number of Stories
Definition: The number of floors for the building as entered in the Building Inventory Edit screen in the District Summary section of ICOS.

This field cannot be edited in the PDM screen; it can only be edited in the Building Inventory Edit screen.

3. Does this include a basement?
Definition: An indication of whether the Number of Floors includes a basement.

Check “Yes”, only if the basement floor was included in the ‘Number of Floors’ number.

4. Is it a finished basement?
This field will only display on the screen if “Yes” was checked for ‘Does this include a basement?’

Definition: An indication of whether the basement is a finished basement.

Check “Yes”, only if the basement is considered finished with a covered ceiling and floor (not dirt).

5. How many feet below is the basement floor from the first floor?
This field will only display on the screen if “Yes” was checked for ‘Is it a finished basement?’

Definition: The number of feet from the basement finished floor to the first-floor finished floor.

Enter the elevation in feet.
6. **Is the building an officially designated emergency shelter?**
Definition: An indication of whether the building has been officially designated as an emergency shelter, i.e., by local, city, county, state, federal.
Check “Yes”, only if it is an emergency shelter.

7. **What is the shelter capacity?**
This field will only display on the screen if “Yes” was checked for ‘Is the building an officially designated emergency shelter?’
Definition: Enter the number of people that may be housed temporarily in the shelter. Note: The Red Cross criterion is 40/SF per person, with a minimum of 15/SF per person for short occupancy only.

8. **Is there a kitchen in the building?**
This field will only display on the screen if “Yes” was checked for ‘Is the building an officially designated emergency shelter?’
Definition: An indication of whether the building has kitchen facilities (refrigeration, cooking, serving) to provide meals for shelter occupants.
Check “Yes”, only if the building has a kitchen.

9. **Is there an emergency generator in the building?**
This field will only display on the screen if “Yes” was checked for ‘Is the building an officially designated emergency shelter?’
Definition: An indication of whether the building has emergency generator fueled by diesel, propane or natural gas to provide electric power for any events that result in loss of grid power.
Check “Yes”, only if the building has an emergency generator fueled by diesel, propane or natural gas to provide electric power for any events that result in loss of grid power.

10. **Does the generator provide enough power for: (select all that apply)**
This field will only display on the screen if “Yes” was checked for ‘Is there an emergency generator in the building?’
Definition: Additional information that identifies the amount of backup power in case of a power outage.
Check all of the boxes for the items the generator powers: air conditioning, communications, heating, lighting, and/or refrigeration.

PDM Pilot Planning Partner Use Only
C. Earthquake Screen

The level of earthquake hazard, which is the probability of a level of ground shaking high enough to result in significant damage to school facilities, has been estimated from the United States Geological Survey (USGS) 2008 National Seismic Hazard Map data and estimates made by the Washington Department of Natural Resources (DNR) estimates of the site class (soil-rock type) for each campus/Facility.

Campuses where the level of seismic hazard is below the threshold defined by the above data are unlikely to have major seismic risk. However, some buildings at sites with relatively low earthquake hazard level may warrant seismic risk evaluation, including:

- Buildings that may be extremely vulnerable to earthquake damage such as unreinforced masonry buildings of more than one story with a very soft first story or tilt-up concrete buildings with very weak roof to wall connections.
- Buildings with unusually high occupancies or are deemed critical facilities, such as the only emergency shelter in a small community.
- Buildings of major historical significance.
- Buildings on sites where site-specific studies indicate softer soils than the DNR estimates based on a geotechnical survey, resulting in amplification of ground motions.
- Sites with high or very high liquefaction potential based on a geotechnical survey.

If a District has buildings with the above characteristics, and Earthquake is not identified in the Statewide identified hazard analysis, then the District may want to choose to enable Earthquake as a District-Identified hazard.

1. Facility Class

Definition: A FEMA HAZUS facility classification used for regional loss estimate calculations for disaster events. Grade Schools (Primary and High School) is the default for all Facilities.

This field is populated by HAZUS and cannot be edited.

2. Site Class (DNR Estimate)

Definition: Site class is an earthquake engineering term to describe the type of rock or soil at a given location. Site class is used for earthquake risk assessments and for the design of seismic retrofits or new construction. Soft soil sites typically amplify earthquake ground motions and buildings on soft soil sites may have more damage in a given earthquake that other similar, nearby buildings on firm soil sites.

These site class estimates were made by the WA Department of Natural Resources (DNR) from surface geology mapping based on complex technical parameters for the top 100 feet of soil/rock, including

PDM Pilot Planning Partner Use Only
shear wave velocity, standard penetration resistance, and soil undrained shear strength.
This field is populated by DNR and cannot be edited.

3. **PGA in 50 Years (w/Site Class) %g – 2%**

Definition: Peak Ground Acceleration (PGA) is a quantitative measurement of the intensity of earthquake ground motions, measured relative to “g”, the acceleration of gravity; the higher the PGA, the stronger the ground shaking. The numerical value is the level of ground shaking which has a 2% chance of being exceeded in a 50-year time period. This level of ground shaking is approximately the worst-case earthquake scenario, although there is a small probability of even higher levels of ground shaking.

This field is calculated from the USGS National Seismic Hazard Map data and the site class data and cannot be edited.

4. **PGA 10% in 50 Years (w/Site Class) %g – 10%**

Definition: PGA has the same definition as above. The numerical value is the level of ground shaking has a 10% chance of being exceeded in a 50-year time period. This level of ground shaking a more likely level of earthquake ground shaking than the 2% in 50 value. However, future earthquakes may occur with levels of ground shaking either lower than or higher than this value.

This field is calculated from the USGS National Seismic Hazard Map data and the site class data and cannot be edited.

5. **Sa (short period spectral acceleration) 2/3rds of 2% in 50 Years, %g**

Definition: The numeric value that represents the short period spectral acceleration for two-thirds of the ground motion which has a 2% probability of being exceeded in 50 years. Spectral acceleration is another measure of the intensity of ground shaking which is used for the seismic design of new buildings and for seismic retrofits.

This field is calculated from the USGS National Seismic Hazard Map data and the site class data and cannot be edited.

6. **Earthquake Ground Motion Percentile**

Definition: This percentile indicates the relative ranking of earthquake hazards for all K-12 campuses in WA. For example, the 99th and 50th percentiles mean that a site has a higher level of ground shaking hazard than 99% and 50%, respectively, of the K-12 campuses. Note: Earthquake risk for a given campus or building depends on the combination of the hazard level and the vulnerability of each building to earthquake damage. Well-designed buildings in high hazard areas may have low risk while unusually
vulnerable buildings, with major seismic deficiencies, may have substantial risk even in low hazard areas. This field is calculated from the USGS National Seismic Hazard Map data for the level of ground shaking (short period spectral acceleration with a 2% probability of being exceeded in 50 years and the site class data and cannot be edited.

7. **Liquefaction Potential (DNR Estimate)**
Definition: Liquefaction occurs during earthquakes when loose soils with high water content temporarily behave like a liquid during strong ground shaking. When liquefaction occurs, buildings may settle into the ground, tilt from vertical or move downslope – all of these phenomena result in increased damage or destruction of an affected building. The data are qualitative rankings of the relative risk of liquefaction happening during an earthquake which results in strong ground shaking at a given site, based on DNR geologic mapping, the inferred site class, and the age of the geologic unit.

This field is populated by DNR and cannot be edited.

8. **Is there a site specific geotechnical study for the Campus?**
Definition: An indication of whether a local hydrologic and hydraulic, geotechnical study with flood hazard data, similar to that in a FEMA Flood Insurance Study, has been completed for the Facility?

Click “Yes”, if a site geotechnical study has been performed for the Campus Facility.

9. **Site Class (Site-Specific Determination)**
This field will only display on the screen if “Yes” was checked for ‘Is there a site specific geotechnical study for the Campus?’

Definition: More accurate site class determinations require site investigations by a geotechnical engineer. If such determinations exist for a given site, this site class determination, rather than the DNR estimate, will be used for earthquake risk assessments. The detailed geotechnical investigation necessary to determine site class is typically only done for new construction or for major structural seismic retrofits. It is not necessary for Districts to make such determinations unless major construction is planned. However, if such data already exist, the determined site class added here will improve the accuracy of earthquake risk assessments for the Campus.

Provide this data only if it already exists, it is not necessary to conduct a study to fill into ICOS.

10. **Liquefaction Potential (Site-Specific Determination)**
This field will only display on the screen if “Yes” was checked for ‘Is there a site specific geotechnical study for the Campus?’

Definition: More refined estimate of the liquefaction potential based on a site-specific evaluation by a
geotechnical engineer. Liquefaction occurs during earthquakes when loose soils with high water content temporarily behave like a liquid during strong ground shaking. When liquefaction occurs, buildings may settle into the ground, tilt from vertical or move downslope – all of these phenomena result in increased damage or destruction of an affected building. The data are qualitative rankings of the relative risk of liquefaction happening during an earthquake which results in strong ground shaking at a given site, based on site-specific geotechnical investigation and are more accurate than the preliminary DNR estimates. The detailed geotechnical investigation necessary to determine liquefaction potential is typically only done for new construction or for major structural seismic retrofits.

Provide this data only if it already exists, it is not necessary to conduct a study to fill into ICOS.

11. Is there an Earthquake emergency evacuation plan?
Definition: An indication of whether the District has an evacuation plan for earthquakes. Click “Yes”, if the Facility has an evacuation plan created.

12. Select Building
Definition: The name of the District Assigned building.
Select the building from the drop down menu to add data. Repeat for each building.

If there are no buildings created for the Facility, then a message will display “No Buildings entered; go to Facility screen to add Buildings.” At least one building must be entered in order for Earthquake screen to be considered Complete. Go to the Facility Inventory screen to add a building and the required information.

If there are buildings added, but no area use records with square footage entered, then a message will display underneath the building saying “No Building Area Use records entered; go to Building Inventory screen to complete.” At least one area use row must be added for the building in order for Earthquake screen to be considered Complete. Go to the Facility Inventory screen to add a building and the required information.

13. Year Built
This field will only display on the screen if there are Buildings created for the Facility.
Definition: The year the area of the building was built.
This data is added in the Building Inventory screen and cannot be edited in the Earthquake screen.

14. District Assigned Area
This field will only display on the screen if there are Buildings created for the Facility.
Definition: The commonly used name of an area of a building, e.g., Wing A, 100, A, 1A.
This data is added in the Building Inventory screen and cannot be edited in the Earthquake screen.

15. **District Assigned Area Use**
This field will only display on the screen if there are Buildings created for the Facility.
Definition: A classification of how a room or area of a building is currently used, regardless of its original design.
This data is added in the Building Inventory screen and cannot be edited in the Earthquake screen.

16. **Seismic Design Basis**
This field will only display on the screen if there are Buildings created for the Facility.
Definition: A classification of the level seismic design basis for a building, which includes increased lateral strength and increased ductility. The higher the design basis, the less damage a building is expected to incur during any given earthquake event.

Buildings are designed for gravity loads, to support the weight of the building, and also for lateral (sideways) loads from seismic and wind forces on the building. Seismic design provisions include increased lateral strength and increased ductility, which allows a building undergo more bending or deformation in an earthquake without losing structural capacity. The level of seismic design of buildings is governed by the seismic provisions in building codes, which vary markedly depending on building location (level of seismic hazard) and the date of construction (because the building codes have changed substantially over the decades). Higher seismic code requirements result in better seismic performance, with less damage and less life-safety risk for a given level of shaking than those for lower code requirements.

This field is populated for each area based on Year Built in the Building Inventory screen and cannot be edited.

17. **Area Building Type**
This field will only display on the screen if there are Buildings created for the Facility.
Definition: A classification of the structural type for a building which provides a building’s strength to resist both gravity (vertical) and lateral (horizontal) forces on the building, including steel or concrete frames, weight bearing walls which may be concrete, masonry or wood, and horizontal members including roof and floor structures.

In order to correctly identify the level of seismic hazard, each building type for each area of the building needs to be correctly identified by building type. One building may have several different building types based on the year it was added or even by what it is used for. Different area for the building can be
added and/or edited in the Building Inventory screen.

Select the correct building type for each Area for the building. There are 28 possible area building types described below. Building “types” refer to the structural systems of the building not the exterior façade. For example, a wood frame building or concrete shear wall building may have a brick veneer, but the structural system is correctly identified as wood frame or concrete shear wall:

- **C1L - Concrete Moment Frame Low-Rise – 1 to 3 Stories**
  This building type has regular rectangular frame geometry like Building Type S1 (see below), but the beams and columns are concrete instead of steel. Floors are typically cast-in-place or precast concrete, but may be wood in older buildings. This is a common building type for older schools.

- **C1M - Concrete Moment Frame Mid-Rise - 4 to 7 stories** – See above C1L.
- **C2L - Concrete Shear Walls Low-Rise – 1 to 3 stories**
  This building has a concrete frame with beams and columns or slabs and columns, with the addition of concrete shearwalls on selected portions of exterior and interior walls. Floors are typically concrete. This is a relatively common building type for newer schools.
- **C2M - Concrete Shear Walls Mid-Rise—4 to 7 stories** — See above C2L.

- **C3L - Concrete Frame with Unreinforced Masonry Infill Walls Low-Rise—1 to 3 stories**

  This building type is an older building type that has a complete concrete frame consisting of concrete columns and beams. Floors are typically concrete or concrete over steel decks, but may also be wood or untopped metal deck.

  This building type is distinguished from other concrete frame buildings by the presence of masonry infill between the exterior concrete columns and often also between some of the interior concrete columns. The infill masonry may be unreinforced solid clay brick, concrete block or hollow-clay tile. This is relatively common building type for older schools.

- **C3M - Concrete Frame with Unreinforced Masonry Infill Walls Mid-Rise—4 to 7 stories**

  - See above C3L.

- **Concrete (generic)** - This is a “last resort” data entry if you cannot determine the structural type for a concrete building. If you having difficulty making the determination of building type, please consult with a knowledgeable engineer before resorting to checking this “generic” concrete building type.
- **PC1 - Precast Concrete Tilt-Up Walls** – Typically 1 story, but class applies to all stories. This building type has precast concrete perimeter wall panels that are cast on-site and then tilted into place. Floor and roof framing may consist of wood joists, glulam beams, steel beams, or open web joists. The floors and roof typically consist of wood sheathing or untopped metal deck. This is not a common building type for schools, but some do exist, especially for large open buildings such as gymnasiums, multi-purpose rooms or cafeterias.

- **PC2L - Precast Concrete Frames with Concrete Shear Walls Low-Rise – 1 to 3 stories** These buildings consist of a frame assembly of precast concrete girders and columns. Floor and roof framing consists of precast concrete planks, tees, or double-tees supported on the girders and columns. Diaphragms consist of precast elements interconnected with welded inserts, cast-in-place closure strips, or reinforced concrete topping slaps. Lateral forces are resisted by precast or cast-in-place concrete shear walls. This is not a common building type for schools in Washington, but some may exist.
- **PC2M - Precast Concrete Frames with Concrete Shear Walls Mid-Rise – 4 to 7 stories**  
  See above PC2L.

- **RM1L - Reinforced Masonry Bearing Walls with Wood or Metal Deck Diaphragms Low-Rise – 1 to 3 stories**

  These buildings have bearing walls that consist of reinforced brick or concrete block masonry. The floor and roof framing consists of steel or wood beams and girders or open web joists and are supported by steel, wood or masonry columns. Diaphragms consist of straight or diagonal wood sheathing, plywood or un-topped metal deck and are flexible relative to the walls. Building types RM1 and RM2 are distinguished by the materials used for floor and roof diaphragms. This is a common building type for schools.

- **RM1M - Reinforced Masonry Bearing Walls with Wood or Metal Deck Diaphragms Mid-Rise - 4 or More Stories** – See above RM1L.

- **RM2L - Reinforced Masonry Bearing Walls with Precast Concrete Diaphragms Low-Rise - 1 to 3 stories**

  This building type is similar to RM1 buildings, except that the diaphragms consist of metal deck with concrete fill, precast concrete planks, tees or double-tees, without or without a concrete topping slab, and are stiff relative to the walls. Building types RM1 and RM2 are distinguished by the materials used for floor and roof diaphragms. This is a common building type for schools.
- **RM2M - Reinforced Masonry Bearing Walls with Precast Concrete Diaphragms Mid-Rise – 4 to 7 stories** – See above RM2L

- **URML - Unreinforced Masonry Bearing Walls Low-Rise – 1 or 2 stories**

These buildings have perimeter bearing walls that consist of unreinforced clay brick, stone or concrete masonry. Interior bearing walls, if present, also consist of unreinforced masonry. In older construction floor and roof framing consists of straight or diagonal lumber sheathing supported by wood joists which, in turn, are supported on posts and timbers. In more recent construction, floors consist of structural panels or plywood sheathing rather than lumber sheathing.

Ties between the walls and diaphragms, if they exist, consist of anchors or bent steel plates embedded in the mortar joints and attached to frame. However, in some buildings the diaphragms simply sit on walls or ledgers. This is a common building type for older schools, for buildings built pre-1900 and in the first half of the 20th century.

URM buildings are distinguished from reinforced masonry buildings by the absence of reinforcing, which cannot be seen visually. Brick URM buildings always use more than a single wythe (layer) of bricks and the wythes are usually tied together by header rows of bricks with their long direction perpendicular to the face of the wall. These header rows are absent on reinforced masonry buildings and thus their presence on a building indicates a URM building. URM buildings may also have steel wall anchors visible on exterior walls.
- **URM - Unreinforced Masonry Bearing Walls Mid-Rise –3 or More Stories** – See above URML.

- **Masonry (generic)** - This is a “last resort” data entry if you cannot determine the structural type for a masonry building. If you having difficulty making the determination of building type, please consult with a knowledgeable engineer before resorting to checking this “generic” concrete building type.

- **S1L - Steel Moment Frame Low-Rise – 1 to 3 stories**

  This building type is characterized by a regular, rectangular frame of steel columns and beams. The steel frame is often obscured by exterior cladding and interior architectural finishes. This is not a common building type for schools, although some do exist.

- **S1M - Steel Moment Frame Mid-Rise – 4 to 7 Stories** - See above S1L.

- **S2L - Steel Braced Frame Low-Rise – 1 to 3 Stories**
This building type is characterized by a regular, rectangular frame of steel columns and beams with the addition of diagonal braces. The diagonal bracing may be visible on the building exterior or visible in window openings. This is not a common building type for schools, although some do exist.

- **S2M - Steel Braced Frame Mid-Rise - 4 to 7 Stories** – See above S2L.
- **S3 - Steel Light Frame – 1 story**
  
  These buildings are one-story pre-engineered and partially prefabricated with light steel framing. The frames are assembled in the field and connected with bolts or welded joints. The roof and walls consist of lightweight metal, fiberglass or cementitious panels. These buildings are not common for schools, although some exist – typically for storage, maintenance or sports facilities.

- **S4L - Steel Frame with Cast-in-Place Concrete Shear Walls Low-Rise – 1 to 3 Stories**
  
  The building type includes a steel frame with beams and columns along with concrete shear walls to provide lateral strength. The shear walls include walls in both directions of the building,
but may or may not be continuous along the full length of all walls. The floors are typically concrete but may be wood in older buildings. This is not a common building type for schools, but some do exist.

- **S4M - Steel Frame with Cast-in-Place Concrete Shear Walls Mid-Rise – 4 to 7 Stories** - See above S4L.

- **S5L - Steel Frame with Unreinforced Masonry Infill Walls Low-Rise –1 to 3 Stories**
  This building type is an older building type that has a complete steel frame consisting of steel columns and floor beams or trusses. Floors are typically concrete or concrete over steel decks, but may also be wood or un-topped metal deck.
  This building type is distinguished from other steel frame buildings by the presence of masonry infill between the exterior steel columns and often also between some of the interior steel columns. The infill masonry may be unreinforced solid clay brick, concrete block or hollow-clay tile. This is not a common building type for schools, but some do exist.

- **S5M - Steel Frame with Unreinforced Masonry Infill Walls Mid-Rise – 4 to 7 Stories** - See above S5L.
- **Steel (generic)** - This is a “last resort” data entry if you cannot determine the structural type for a steel building. If you having difficulty making the determination of building type, please consult with a knowledgeable engineer before resorting to checking this “generic” concrete building type.

- **W1 - Wood Light Frame**
  
  This building type is characterized by wood framing throughout the building including stud walls, joists and rafters. Floor and roof diaphragms may be straight wood, diagonal wood, tongue-and-grove-planks, plywood or oriented strand board. The first floor framing may be supported directly on a slab or perimeter foundation or raised on short cripple-wall studs or post-and-beam supports.

  Exterior finish materials may be wood siding, metal siding, stucco or brick veneer. Interior partition walls are sheathed in plaster or gypsum drywall board.

- **Portable**
  
  Portable classrooms are factory built structures, usually in one or two pieces, which are assembled on site. Portables are most similar to W1, small wood frame building, but differ in some characteristics, especially the types of foundations used. Thus, for seismic risk assessments, portables are considered a separate building class.

18. **For Portables, what is the foundation type?**

This field will only display on the screen if the building type is “Portable”.

Definition: A part of the substructure of a building upon which the building shell is constructed.

Select the appropriate option:

1. Slab on Grade
2. Raised on Blocks
3. Raised on short wood stud walls – add this
4. Other

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19. **If “Other”, please describe**
This field will only display on the screen if “Other” was selected for ‘For portables, what is the foundation type?’
Definition: Wording that describes portable building foundation type.
Briefly describe the foundation on which the portable sits.

20. **Is the portable building anchored/bolted to a slab or tied-down for seismic and wind forces?**
This field will only display on the screen if the building type is “Portable”.
Definition: An indication of whether the portable building is anchored or bolted to a slab or tied-down for seismic and wind forces.
Click “Yes”, if the portable building is anchored or bolted to a slab or tied-down.

21. **Does the building have substantial horizontal plan irregularities?**
This field will only display on the screen if the building type is NOT “Portable”.
Definition: An indication of whether a building has substantial horizontal plan irregularities. From a seismic design perspective, to minimize damage in earthquakes, the ideal building is regular in all directions with no major differences in strength. The presence of significant vertical or plan irregularities often results in greater levels of damage for a given level of earthquake ground shaking.
The following figures from FEMA, illustrate typical horizontal irregularities found in buildings.

![Horizontal Irregularities with Arrows Indicating Locations of Concern](image)
Click “Yes”, if the building has horizontal irregularities.

22. **Does the building have substantial vertical irregularities?**
This field will only display on the screen if the building type is NOT “Portable”.
Definition: An indication of whether a building has substantial vertical irregularities, such as one story
which is taller or weaker than others, or setbacks of higher stories. From a seismic design perspective, to minimize damage in earthquakes, the ideal building is regular in all directions with no major differences in strength. The presence of significant vertical or plan irregularities often results in greater levels of damage for a given level of earthquake ground shaking.

The following figures from FEMA, illustrate typical vertical irregularities found in buildings. Soft first stories are those with higher story height than upper stories and/or significantly larger window/door openings.

Vertical Irregularities with Arrows Indicating Locations of Concern

Click “Yes”, if the building has vertical irregularities.
23. **Has a Seismic Risk Evaluation been performed?**
Definition: An indication of whether a seismic risk evaluation has been completed.
Click “Yes”, if a seismic risk evaluation has been completed on the building.

24. **Date of Risk Evaluation**
This field will only display on the screen if “Yes” was checked for ‘Has a seismic risk evaluation been performed?’
Definition: The date of the structural seismic retrofit for a building.
Provide a date in which the risk evaluation was completed. (Format: MM/DD/YYYY)

25. **Did the risk assessment use the ASCE 31-03 Method – Structural Evaluation?**
This field will only display on the screen if “Yes” was checked for ‘Has a seismic risk evaluation been performed?’
Definition: An indication of whether the structural risk evaluation method used was (American Society of Civil Engineers) ASCE 31-03 method. ASCE 31 means the *Seismic Evaluation of Existing Buildings ASCE/SEI 31-03* published by the American Society of Civil Engineers and the Structural Engineering Institute which is the process of evaluating an existing building for the potential earthquake-related risk to human life posed by that building, or building component, and the documentation of that evaluation, performed and written according to the provisions of ASCE 31.
Click “Yes”, if the structural seismic risk evaluation method was American Society of Civil Engineers (ASCE) 31-03.

26. **What is the ASCE Structural Evaluation Tier?**
This field will only display on the screen if “Yes” was checked for ‘Did the risk assessment use the ASCE 31-03 Method–Structural Evaluation?’
Definition: A classification of American Society of Civil Engineers (ASCE) structural evaluation tiers. Each evaluation tier involves completing a check list of building characteristics along with specified structural calculations. Select the appropriate ASCE Tier for the structural evaluation tier used:

**Tier 1 – Screening Phase** - Consists of three sets of checklists that allow rapid evaluation of the structural, nonstructural, and foundation/geologic hazard elements of the building and site conditions. It is completed for all building evaluations conducted in accordance with this standard. The purpose of a Tier 1 Evaluation is to screen out buildings that comply with the provisions of this standard or quickly identify potential definiteness. In some cases, “Quick Checks” may be required during a Tier 1 Evaluation; however, the level of analysis necessary is minimal. If deficiencies are identified for a building using the checklists, the design professional
may proceed to Tier 2 and conduct a more detailed evaluation of the building or conclude the evaluation and state that potential deficiencies were identified. In some cases, a Tier 2 or Tier 3 Evaluation may be required, even if no deficiencies are noted in Tier 1.

**Tier 2 – Evaluation Phase** - Consists of a complete analysis of the building that addresses all of the deficiencies identified in Tier 1 shall be performed. Analysis in Tier 2 is limited to simplified linear analysis methods. If deficiencies are identified during a Tier 2 Evaluation, the design professional may choose to either conclude the evaluation and report the deficiencies or proceed to Tier 3 and conduct a detailed seismic evaluation.

**Tier 3 – Detailed Evaluation Phase** – Performed when the design professional chooses to further evaluate buildings for which potential deficiencies were identified in Tier 1 or Tier 2. Potential deficiencies shall be summarized upon completion of the Tier 3 Evaluation. Recent research has shown that certain types of complex structures can be shown to be adequate using nonlinear analysis procedures even though other common procedures do not. While these procedures are complex and expensive to carry out, they often result in construction savings equal to many times their cost. The use of Tier 3 procedures must be limited to appropriate cases.

27. **Provide description of evaluation method.**
This field will only display on the screen if “No” was checked for ‘Is it ASCE 31-03 Method – Structural?’

Definition: Wording that describes the structural evaluation method other than (American Society of Civil Engineers) ASCE 31-03.

Briefly describe the seismic risk evaluation method used.

28. **Did the risk assessment use the ASCE 31-03 Method – Non-Structural Evaluation?**
This field will only display on the screen if “Yes” was checked for ‘Has a seismic risk evaluation been performed?’

Definition: An indication of whether the non-structural risk evaluation method used was (American Society of Civil Engineers) ASCE 31-03 method. Non-structural evaluation includes architectural and electrical components that are permanently attached to the structure and for their supports and attachments.

Click “Yes”, if the non-structural seismic risk evaluation method was American Society of Civil Engineers (ASCE) 31-03.
29. **What is the ASCE Non-Structural Evaluation Tier?**

This field will only display on the screen if “Yes” was checked for ‘Did the risk assessment use the ASCE 31-03 Method-Non-Structural Evaluation?’

Definition: A classification of American Society of Civil Engineers (ASCE) structural evaluation tiers. Each evaluation tier involves completing a check list of building characteristics along with specified structural calculations. Select the appropriate ASCE Tier used for the non-structural evaluation used:

- **Tier 1 – Screening Phase** - Consists of three sets of checklists that allow rapid evaluation of the structural, nonstructural, and foundation/geologic hazard elements of the building and site conditions. It is completed for all building evaluations conducted in accordance with this standard. The purpose of a Tier 1 Evaluation is to screen out buildings that comply with the provisions of this standard or quickly identify potential definiteness. In some cases, “Quick Checks” may be required during a Tier 1 Evaluation; however, the level of analysis necessary is minimal. If deficiencies are identified for a building using the checklists, the design professional may proceed to Tier 2 and conduct a more detailed evaluation of the building or conclude the evaluation and state that potential deficiencies were identified. In some cases, a Tier 2 or Tier 3 Evaluation may be required, even if no deficiencies are noted in Tier 1.

- **Tier 2 – Evaluation Phase** – Consists of a complete analysis of the building that addresses all of the deficiencies identified in Tier 1. Analysis in Tier 2 is limited to simplified linear analysis methods. If deficiencies are identified during a Tier 2 Evaluation, the design professional may choose to either conclude the evaluation and report the deficiencies or proceed to Tier 3 and conduct a detailed seismic evaluation.

- **Tier 3 – Detailed Evaluation Phase** – Performed when the design professional chooses to further evaluate buildings for which potential deficiencies were identified in Tier 1 or Tier 2. Potential deficiencies shall be summarized upon completion of the Tier 3 Evaluation. Recent research has shown that certain types of complex structures can be shown to be adequate using nonlinear analysis procedures even though other common procedures do not. While these procedures are complex and expensive to carry out, they often result in construction savings equal to many times their cost. The use of Tier 3 procedures must be limited to appropriate cases.

30. **Provide description of evaluation method.**

This field will only display on the screen if “No” was checked for ‘Is it ASCE 31-03 Method – Non-Structural?’

Definition: Wording that describes the non-structural evaluation method other than (American Society of Civil Engineers) ASCE 31-03. Briefly describe the non-structural seismic risk evaluation method used.
31. **Has a Structural Seismic Retrofit been performed?**

Definition: An indication of whether the structural seismic retrofit has been completed. Structural building components provide a building’s strength to resist both gravity (vertical) and lateral (horizontal) forces on the building. Structural elements include steel or concrete frames, weight bearing walls which may be concrete, masonry or wood and horizontal members including roof and floor structures.

Click “Yes”, if a structural seismic retrofit has been completed on the building.

32. **Date of Structural Seismic Retrofit**

This field will only display on the screen if “Yes” was checked for ‘Has a Structural Seismic Retrofit been completed?’

Definition: The date of structural seismic retrofit for a building.

Provide the year (YYYY) in which the retrofit was completed.

33. **What is the Structural Seismic Retrofit performance objective?**

This field will only display on the screen if “Yes” was checked for ‘Has a Structural Seismic Retrofit Been Completed?’

Definition: A representation of a seismic retrofit performance objective.

For new buildings, the minimum level of seismic performance is prescribed by building code requirements. However, there are no such building code requirements for seismic retrofits. Rather, the level of seismic performance desired for retrofits is up to each building’s owner. Risk Reduction and Collapse Prevention typically involve structural mitigation measures only, while the higher levels of retrofit necessarily include both structural and nonstructural mitigation measures.

Select the appropriate option:

1. **Risk Reduction**: Minor structural measures that mitigate obvious deficiencies such as bracing parapets, but without addressing the seismic performance of the entire building.

2. **Collapse Prevention**: The minimum structural measures necessary to prevent collapse of a building. This performance level may result in high levels of damage in a future earthquake, the building may be a complete loss and there is a reduced, but perhaps significant life safety risk from failure of nonstructural building components.

3. **Life Safety**: Structural measures to prevent collapse and non-structural measures to provide post-earthquake egress and minimize the potential for casualties. In a future earthquake, the building may require substantial repairs before it can be re-occupied and repair may not be economically viable. This is the most common level of seismic retrofit for schools.

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4. **Immediate Occupancy**: A higher level of retrofit designed to minimize structural and non-structural damage to a low enough level that the building may be occupied immediately after an earthquake. This is a higher level of retrofit for schools and is not common but may be appropriate if the school is especially important, such as the only emergency shelter in a small, isolated community.

5. **Post-Earthquake Operability**: Similar to the immediate occupancy level of retrofit with the addition on back-up utility systems to allow post-earthquake operability of the facilities functions. This level of retrofit is typical only for critical facilities such as 911 call centers or emergency operations centers.

34. **Briefly describe the Structural Seismic Retrofit**
This field will only display on the screen if “Yes” was checked for ‘Has a Structural Seismic Retrofit Been Completed?’

Definition: Wording that describes the structural retrofit. For example, strengthen roof diaphragm, add shear walls, upgrade foundation, etc.

Briefly describe the retrofit measures implemented.

35. **Has a Non-Structural Seismic Retrofit been performed?**
Definition: An indication of whether a building has been retrofitted for non-structural seismic performance. Nonstructural components include architectural finishes, non-bearing partition walls, ceilings, electrical, mechanical and plumbing systems and all other building parts that do not provide strength to resist gravity or lateral forces on the building. Nonstructural retrofits also include bracing or anchoring of building contents such as bookcases.

Click “Yes”, if the building was included in a non-structural seismic retrofit project.

36. **Date of Non-Structural Seismic Retrofit**
This field will only display on the screen if “Yes” was checked for ‘Has a Non-Structural Seismic Retrofit been performed?’

Definition: The date of non-structural seismic retrofit for a building.

Provide the year (YYYY) in which the retrofit was completed.
37. **Briefly describe the Non-Structural Seismic Retrofit**

This field will only display on the screen if “Yes” was checked for ‘Has a Non-Structural Seismic Retrofit been performed?’

Definition: Wording that describes the non-structural retrofit.

Briefly describe the retrofit measures implemented such as brace light fixtures, anchor bookcases and file cabinets to walls, replace suspended ceilings, etc.

**D. Flood Screen**

The initial statewide screening for school facilities vulnerable to flood was based on determining which school facilities are located within FEMA mapped floodplains. This determination was based on GIS overlay of the FEMA mapped floodplains with campus locations. Some campuses which are not within FEMA-mapped floodplains may warrant flood risk evaluation, including:

- Schools with a history of flooding affecting buildings or coming close to affecting buildings.
- Schools near FEMA mapped floodplains, especially if the FEMA Flood Insurance Study is old (more than 10 years old) and there has been substantial development in the watershed.
- Schools located near small streams not mapped by FEMA Flood Insurance Maps.

If a District has buildings with the above characteristics, and Flood is not identified in the Statewide identified hazard analysis, then the District may want to choose to enable Flood as a District-Identified hazard.

**For the flood data, there is an “update” issue – the information in data fields 1, 2 and 3 below are auto-populated with October-November 2012 data. The FEMA floodplain mapping and Flood Insurance Studies are gradually updated over time, so this auto-populated data will gradually be superseded by newer FEMA data. The District is encouraged to update the date when a new study has been performed on their Facilities.**

1. **Is the Campus within a FEMA mapped Flood zone?**

Definition: An indication of whether the campus is within the Federal Emergency Management Agency mapped flood zones.

This field is populated from the FEMA DFIRM and Q3 flood maps and GIS data on the location of the campus and cannot be edited.
2. **FEMA Flood Insurance Rate Map Date**
   This field will only display on the screen if “Yes” was checked for ‘Is the Campus within the FEMA mapped Flood zone?’
   Definition: The date of the most current FEMA flood insurance map that determines the FEMA Flood Zone.
   This field is populated from the FEMA DFIRM and Q3 flood maps and GIS data on the location of the campus and cannot be edited.

3. **Is the campus outside, but near (within one mile) a FEMA mapped flood plain?**
   Definition: An indication of whether the Campus is within one mile of the FEMA mapped flood plain.
   This field shows the distance between the nearest FEMA mapped floodplain and the campus, if this distance is less than one mile. The closer the campus is to mapped floodplains, the greater the likelihood that the campus has some level of flood risk. However, the potential flood risk also depends strongly on the elevation of the campus.
   This field is populated from the FEMA DFIRM and Q3 flood maps and GIS data on the location of the campus and cannot be edited.

4. **Distance to 100-Year Floodplain (miles)**
   This field will only display on the screen if “Yes” was checked for ‘Is the campus outside, but near (within one mile of) a FEMA mapped floodplain?’
   Definition: The number of miles the campus is to the 100-year flood plain.
   This field is populated by DNR and cannot be edited.

5. **How many times has the Campus flooded that caused school closure and/or building damage in the past 20 years?**
   Definition: The number of occurrences the campus has flooded that caused school closure and/or building damage in the past 20 years.
   Definition: The number of occurrences the campus has flooded.
   Enter the number of times the campus has flooded in the past 20 years.

6. **What year was the last flood?**
   This field will only display on the screen if ‘How many times has the Campus flooded that caused school closure and/or building damage in the past 20 years?’ is greater than zero (0).
   Definition: The year the Campus last flooded. Enter the year (YYYY) the campus last flooded.
7. **Are you concerned about flood risk, such as flooding from stormwater drainage, behind a levee and/or downstream from a dam, even if the school is not within a FEMA mapped flood plain?**

Definition: An indication of whether the district has concerns about flooding if there is a history of floods that affected a campus or came close to affecting a campus, even if the facility is not within the FEMA mapped flood plain.

For example, did the flooding affect the grounds only or was the flooding deep enough to damage building(s). If building damages occurred, provide estimates of the depth of flooding above the first floor and estimated damages (dollars).

Click “Yes”, if there is any concern that the Campus may be affected by a flood.

8. **Briefly explain why you are concerned.**

This field will only display on the screen if “Yes” was checked for ‘Are you concerned about flood risk, even if the school has a potential risk, but not within a FEMA mapped floodplain?’

Definition: Wording that describes the District flood risk and concerns.

Briefly describe why you are concerned about flood risk for your Campus.

9. **Is the Flood risk potentially significant?**

Definition: An indication of whether the Campus has a significant flood risk.

This entry will be automatically populated from previous District Flood screen entries and cannot be edited.

a. Yes - Campus is within FEMA mapped flood plain and/or District has expressed concerns about flood risk.

b. Maybe - Campus is outside, but near FEMA mapped flood plain.

c. Probably Not - Campus is not in or near FEMA mapped flood plain and District has not expressed concerns about possible flood risks.

10. **Is there a Flood emergency evacuation plan?**

This field will only display on the screen if “Yes” or “Maybe” is checked for ‘Is the Flood risk potentially significant?’

Definition: An indication of whether there is a flood emergency evacuation plan.

Click “Yes”, if the Campus has a written and planned emergency evacuation plan.
11. Has a FEMA Flood Insurance Study been performed?
Definition: An indication of whether a FEMA Flood Insurance Study has been completed for the Campus.

Flood Insurance Studies (FIS) exist for all communities in WA that have FEMA mapped floodplains and regulatory floodplains (for flood insurance and zoning/permitting purposes). More recent Flood Insurance Studies are typically for entire counties, while older studies were often for a single community within a county. Flood insurance studies include the stream discharge data and the flood elevation data requested below in subsequent data fields. For a given county or community covered by a Flood Insurance Study, there may be a few or a large number of Flood Insurance Rate Maps.

12. Has a local flood study been performed, instead of a FEMA flood insurance study?
Definition: An indication of whether a local flood study has been performed.

If there is no FEMA FIS or the FEMA FIS is old and superseded by the newer local study, the local data study may be used instead of the FEMA data for flood risk assessments.

Click “Yes”, if a local flood study has been performed, other than the FEMA flood insurance study.

The following fields 20-29 will only display on the screen if “Yes” is checked for ‘Has a FEMA Flood Insurance Study been performed?’ or ‘Has a local flood study been performed, instead of a FEMA flood insurance study?’

13. Flood Study Name
This field will only display on the screen if “Yes” is checked for ‘Has a FEMA Flood Insurance Study been performed?’ or ‘Is there a local hydrologic and hydraulic study with flood hazard data similar to that in a FEMA flood insurance study (FIS)?’
Definition: The name of the flood study.
Enter the name as it appears on the Insurance Study.

14. Flood Study Date
Definition: The date that the flood study was completed.
Enter the Date from the front page of the Insurance Study. MM/DD/YYYY
15. **Primary Flood Source Name**
Definition: A word or words by which the primary flood source is known.
Enter the name of the river or stream posing flood risk to the campus.

Note: The flood source can also be obtained from the FIRMs, which requires downloading the index map to identify which FIRM(s) include the immediate vicinity of the campus and then downloading the appropriate maps. Often, one may have to guess which FIRM covers a specific location and it might take a couple of tries to get the right FIRM map(s).

16. **Flood Discharge (cubic feet per second)**
Definition: The numeric value representing the volume of water flowing in the river (cubic feet per second) for and x-year flood event.

Flood discharges are used in flood calculations. Flood discharge data for several flood return periods is used along with flood elevation data to calculate the probability of floods affecting a given building. These data allow calculation of the annual probability of floods of various depths, relative to the first floor, such as 1 foot, 2 feet, etc. Flood discharge data for a FEMA-mapped stream are obtained from the FIS which includes Tables of Discharges for each stream or river included in the studies.

If the stream posing flood risk for your campus has more than one set of discharge data, enter the data for the nearest location downstream of the campus. In the flood discharge table the 10-, 50-, 100- and 500-year flood events are labeled as the 10%, 2%, 1% and 0.2% Annual Chance Floods. For coastal flooding from the Pacific Ocean or Puget Sound, there are no stream discharge data.

Enter the flood discharge value for each year:

- **10 Year**
Enter numeric value representing the volume of water flowing in the river (cubic feet per second) for 10-year flood event.

- **50 Year**
Enter the numeric value representing the volume of water flowing in the river (cubic feet per second) for 50-year flood event.

- **100 Year**
Enter the numeric value representing the volume of water flowing in the river (cubic feet per second) for 100-year flood event.

- **500 Year**
Enter the numeric value representing the volume of water flowing in the river (cubic feet per second) for 500-year flood event.
second) for 500-year flood event.

17. **Do the Flood Discharge values come from a local flood study instead of a FEMA Flood Insurance Study?**
Definition: An indication of whether the flood discharge data came from a local flood study instead of a formal FEMA Flood Insurance Study.

If there is no FEMA FIS or the FEMA FIS is old and superseded by the newer local study, the local data study may be used instead of the FEMA data for flood risk assessments.

Click “Yes”, if the data came from any other flood study than FEMA.

18. **Flood Profile Number**
Definition: The unique identifier of the flood profile. Each flood profile shows flood elevations along a specified reach of the stream. For streams with long reaches within a given community, there may be many flood profiles. The flood profile nearest to a campus can be determined from the landmarks on the flood profiles (such as street or railroad crossings) or from the lettered stream cross sections which are marked on the flood profile graphs and shown on the FIRMs.

Enter the Flood Insurance Study Profile Number for this campus.

19. **Flood Elevation from Flood Profile Graph (feet)**
Definition: The number of feet for the x-year flood elevation.

Flood Insurance Studies include flood elevations along the mapped reaches of all of the streams including in the study. Flood elevations for a given flood, such as the 100-year flood, vary markedly along the reach of river because water always flows downhill. In the FIS, flood elevations are shown on Flood Profile Graphs. For flood hazard analysis it is critically important to locate the Flood Profile Graph which contains the reach of the river adjacent to the campus and to identify correctly the location of the campus on the Flood Profile Graph. Flood elevation data typically include the 10-, 50-, 100- and 500-year elevations, along with the stream bottom elevation.

Enter all five elevations which are required for quantitative flood hazard analysis for the specific location on the flood profile graph adjacent to the midpoint of the campus.

10 Year
Enter the number of feet for the 10 year flood elevation.

50 Year
Enter the number of feet for the 50 year flood elevation.
100 Year
Enter the number of feet for the 100 year flood elevation.

500 Year
Enter the number of feet for the 500 year flood elevation.

20. Do the Flood Elevation values come from a local flood study instead of a FEMA Flood Insurance Study?
Definition: An indication of whether the flood elevation data came from a local flood study instead of a formal FEMA Flood Insurance Study.

If there is no FEMA FIS or the FEMA FIS is old and superseded by the newer local study, the local data study may be used instead of the FEMA data for flood risk assessments.

Click “Yes”, if the data came from any other flood study than FEMA.

21. Stream Bottom Elevation from Flood Profile Graph (feet)
Definition: The number of feet of the stream bottom elevation.

Enter the stream bottom elevation found in the Flood Insurance Study.

22. Reference Datum for Elevations, found in Flood Insurance Study
Definition: The number of feet for the Campus elevation.

The Flood Insurance Study will identify the reference datum used to define flood elevations. The reference datum will be either the National Geodetic Vertical Datum of 1929 or North American Vertical Datum of 1988. The 1929 and 1988 reference datum differ significantly so it is important to enter the number into only one correct field.
E. Tsunami Screen

The analysis used digitized tsunami inundation maps developed by DNR based on tsunami modeling performed by National Oceanic Atmospheric Association (NOAA) and feedback from local jurisdictions. The communities covered by these maps include coastal counties, the inland waters of the Puget Sound, and the Strait of Juan de Fuca. The inundation areas for coastal counties were based on a tsunami generated by a M9.1 earthquake on the Cascadia Subduction Zone.

The inundation areas for the inland waters of the Puget Sound were based in a tsunami generated by a M7.3 earthquake on the Seattle Fault and a tsunami generated by a M7.1 earthquake on the Tacoma Fault. School facilities determined to be at risk to tsunamis were determined based on a spatial query performed for those school facilities that were located within the tsunami inundation zones.

If a District has Campuses which are near a mapped tsunami evacuation zones and/or at elevations below 50 feet may wish to evaluate tsunami risk, and Tsunami is not identified in the Statewide identified hazard analysis, then the District may want to choose to enable Tsunami as a District-Identified hazard.

1. Is the Campus within the DNR mapped Tsunami Inundation zone?
   Definition: An indication of whether the campus is within the Department of Natural Resources (DNR) mapped tsunami inundation zone.

   This field is populated by DNR and cannot be edited.

2. Straight Line Distance to Coast (miles)
   Definition: The number of miles to the coast in a straight line from the campus.

   This field is populated from GIS data and cannot be edited.

3. Campus GIS Elevation at Grade, NAVD 1988
   Definition: The number of feet of ground elevation for the Campus for the North American Vertical Datum of 1988.

   This field is populated from GIS elevation data and cannot be edited.
4. **Is the Campus at risk for a Tsunami?**

Definition: An indication of whether the campus is at risk for tsunami.

This entry will be automatically populated from previous District Tsunami screen entries and cannot be edited.

   a. Yes - Within mapped tsunami inundation area.
   b. Maybe - Not within mapped tsunami inundation area, but within 3 mile of coast and campus grade elevation <30 feet.
   c. Probably Not – Campus elevation >30 and <50 feet regardless of distance from coast; could be at risk for unusually large tsunamis.
   d. No - Risk is very low; campus elevation >50 feet elevation regardless of distance from coast.

5. **Travel Distance to Nearest Accessible High Ground (miles)**

Definition: The number of miles to the nearest accessible high ground at least 50 feet elevation with 100 feet elevation being preferred if possible. Each school within a mapped or possible tsunami inundation zone should have one or more pre-determined evacuation routes and one or more designated evacuation shelters or gathering points. The minimum safe elevation for evacuation is 50 feet, with 100 feet being even better. For schools with no evacuation area accessible within the anticipated warning time between the end of earthquake ground shaking and tsunami first arrival, the evacuation point should be the highest reachable elevation.

Enter the number of road or path miles to reach safe high ground.

6. **Estimated Travel Time on Foot (minutes)**

Definition: The estimate total minutes it takes to reach the safe location by foot.

Take the following into consideration when estimating travel distance to a designated tsunami evacuation shelter or gathering point:

   - Path length along streets or pedestrian walkways. Consider off-street segments only if clearly passable, such as mowed grass areas with no fence barriers impeding evacuation.
   - For most coastal areas, ground may subside 3 to 5 feet during an earthquake. Thus, evacuation paths should avoid segments with low-elevations. Ideally, evacuation routes should be at least 10 feet above sea level when possible.
   - When possible, avoid evacuation routes which include bridges with known or possible seismic deficiencies because bridges may be impassable after the earthquake.

Enter the estimated number of minutes it takes to reach the evacuation shelter by foot.
7. **Potential impediments to evacuation along designated evacuation routes: (select all that apply)**

Definition: A classification of potential impediments to evacuation along designated evacuation routes.

If there are possible impediments to evacuation, select one or more of the following:

a. Low areas below 10 feet elevation
b. Bridge(s)
c. Possible landslide areas
d. Routes with large trees and/or above ground power lines subject to blocking routes
e. Other
f. None

Select all impediments that apply to your Campus.

8. **Is there a Tsunami emergency evacuation plan?**

Definition: An indication of whether there is a tsunami emergency evacuation plan.

Click “Yes”, if the Campus has a written and planned emergency evacuation plan.

If “No”, then developing an evacuation plan is a strong recommendation for every campus within the mapped inundation zones and a priority for campuses that may be at risk.
F. Lahar Screen

Lahar hazard zones developed by the USGS Cascades Volcano Observatory in 1996 and 2004 are used to identify school facilities to subject to lahars from volcano events. A spatial query was performed to determine which school facilities were located in each of these hazard zones. Facilities located within the volcano hazard zones were considered at risk to a potential volcanic event.

If a District has Campuses which are near a mapped USGS mapped Lahar zone, but Lahar is not identified in the Statewide identified hazard analysis, then the District may want to choose to enable Lahar as a District-Identified hazard.

1. Is the Campus within a USGS-mapped Lahar zone?
Definition: An indication of whether the campus is within a USGS mapped lahar zone.
This field is populated from USGS lahar mapping and campus locations and cannot be edited.

2. Volcano(s) Posing Risk with Related Specific Lahar Zones
This field will only display on the screen if “Yes” is checked for ‘Is the Campus within a USGS mapped Lahar zone?’
Definition: A representation of the volcano(s) posing risk to the campus, e.g., Adams, Baker, Glacier, Hood, Rainier and the related lahar zones. The zones for each volcano are:

- Mount Adams: Zone LB, Zone LA
- Mount Baker: Case 1-2, Case M
- Glacier Peak: Lahar
- Mount Hood: Case DA
- Mount Rainier: Case 1, Case 2
- Mount St. Helens: Lahar

This field is populated from USGS lahar mapping and campus locations and cannot be edited.
3. **USGS Estimated Return Period for Lahar Zone (years)**

Definition: The number of years the U.S. Geological Service predicts another lahar may occur again in the same lahar zone.

The lahar return period is the average time interval between lahar events. For example, a 500-year return period means a lahar is expected about once every 500 years on average. However, volcanoes are unpredictable and the time between eruptions may be highly variable. Return periods for lahars are most accurately interpreted simply as estimates of the probability of future lahars.

This field is populated from USGS lahar mapping and campus locations and cannot be edited.

4. **Lahar Probability % in a 50 year Time Period**

Definition: The estimated probability that a lahar event will occur in the next 50 years.

This field is calculated based on the return period and cannot be edited.

5. **Straight Line Lahar Distance to Campus (miles)**

Definition: The number of miles between volcanic peak(s) and the Campus. This field is the straight line distance between the volcanic peak (s) and the campus, as determined from GIS data. This field cannot be edited.

This field is populated by GIS and cannot be edited.

6. **Approximate Lahar Travel Time to Campus (minutes)**

Definition: The number of hours/minutes for the lahar to travel to the campus.

This field is estimated from the distance along flow routes and typical lahar flow velocities; actual lahar travel times may vary significantly from event to event.

This field is populated by GIS and cannot be edited.

7. **Is there a Lahar emergency evacuation plan?**

Definition: An indication of whether there is a lahar emergency evacuation plan.

Click “Yes”, if the Campus has a written and planned emergency evacuation plan. If not, then developing an evacuation plan is recommended for the Campus.

8. **Is there a designated lahar safe haven/shelter location where students/staff will go if evacuation for a lahar event is necessary?**

Definition: An indication of whether there is a designated shelter for students and staff.

Click “Yes”, if there is a planned designated evacuation shelter location for the students and staff.
9. **How many miles to the designated safe haven/shelter?**
This field will only display on the screen if “Yes” is checked for ‘Is there a designated lahar safe haven/shelter location where students/staff will go if evacuation for a lahar event is necessary?’

Definition: The number of miles via normal street routes to the nearest accessible safe haven outside of lahar zone.

Enter the number of miles to the designated safe haven/shelter.

10. **Select the planned evacuation method:**
This field will only display on the screen if “Yes” is checked for ‘Is there a designated lahar safe haven/shelter location where students/staff will go if evacuation for a lahar event is necessary?’

Definition: The type of method used for evacuation, either bus or by foot.

Select the evacuation method from the drop down box.

11. **Estimated time to mobilize evacuation, including notifying drivers, drivers to reach bus location(s), travel time to school and travel time to designated locations, taking into account emergency conditions during volcanic events. (minutes)**
This field will only display on the screen if “Bus” is checked for ‘Select the planned evacuation method’

Definition: The number of minutes it would take to mobilize an evacuation including bus drivers and travel time.

Enter the total number of minutes it would take to mobilize an evacuation by bus.

12. **Briefly describe the evacuation details**
This field will only display on the screen if “Bus” is checked for ‘Select the planned evacuation method’

Definition: Additional information describing the evacuation details.

Briefly describe the evacuation details and process.

13. **Estimated Travel Time on Foot to Safe Haven (minutes)**
This field will only display on the screen if “Foot” is checked for ‘Select the planned evacuation method’

Definition: The number of minutes by foot travel to the nearest accessible high ground.

This field is populated by GIS and cannot be edited.

14. **Describe the potential impediments to evacuation, for example, the nearest Safe Haven is across a river which does not have a bridge for crossing**
Definition: Additional information on the potential impediments to evacuation.

Briefly describe the impediments to evacuation.
15. **Lahar Hazard Level**
Definition: A classification of lahar hazard level. In principle, the level of hazard depends on the return period for the lahar event(s) affecting a given campus, the estimated travel time to the campus, and the evacuation time estimate.

This field is populated by previous District data entry in the screen and cannot be edited.

G. **Wildland/Urban Interface Fire Screen**

Wildland/urban interface fires are fires in which the fuel includes both vegetation and structures. Hazard mapping for wildland/urban interface fires is based on two datasets: 1) Communities designated by the Washington State Department of Natural Resources as (DNR) High Risk Communities, and 2) probabilistic wildland fire maps developed by the United States Geological Survey (USGS) which estimate the average burn return period for wildland fires.

Some additional campuses may warrant wildland/urban interface fire risk evaluations, including:

- Those in relatively isolated rural communities with limited fire suppression resources.
- Campuses adjacent or near areas with high vegetative fuel loads.

If a District has Campuses with the above characteristics, and Wildland/Urb an Fire is not identified in the Statewide identified hazard analysis, then the District may want to choose to enable Fire as a District-Identified hazard.

1. **Is the Campus within a Department of Natural Resources mapped Wildland/Urban Interface (WUI) Community?**
Definition: An indication of whether the campus is within the Department of Natural Resources (DNR) mapped Wildland/Urban Interface community.

This field is derived from DNR designations of High Risk Communities for wildland/urban interface fires and cannot be edited.

2. **WUI Community Fire Hazard Rating**
Definition: A classification of fire hazard level distinguished by the Department of Natural Resources (DNR) mapped Wildland/Urban Interface community.

This field is derived from DNR designations of High Risk Communities for wildland/urban interface fires and cannot be edited.

3. **USGS Landfire Mean Fire Return Period (years)**
Definition: The fire return period is the average time interval between wildland fire events. For example, a 200-year return period means a fire is expected about once every 200 years on average.
However, wildland fires are unpredictable and the time between events may be highly variable. Return periods for wildland fires are most accurately interpreted simply as estimates of the probability of future fires.

This field is taken from the USGS Landfire mapping and cannot be edited.

4. **Wildland Fire Probability % in a 50 year Time Period**

Definition: The estimated probability that a fire event will occur in the next 50 years.

This field is calculated and cannot be edited.

5. **Are there areas with high vegetative fuel loads adjacent to or in proximity to the campus?**

Definition: An indication of whether there are vegetative areas with a high concentration of forest, brush or grasslands adjacent to or in proximity to the campus. Click “Yes”, if the Campus has high vegetative fuel loads nearby.

6. **How close are the high fuel load areas to the campus?**

This field will only display on the screen if “Yes” was checked for ‘Are there areas with high vegetative fuel loads adjacent to or in proximity to the campus?’. High fuel load areas are those with high concentrations of trees, brush or grasslands.

Definition: A representation of how close the high fuel load areas are to the campus.

Select the distance for your campus:

1. Immediately adjacent
2. Within 0.25 miles
3. Within 0.5 miles
4. Within 1 mile
5. Within 2 miles
6. Greater than 2 miles

7. **Have any fire safe practices been implemented for this campus, such as establishing defensible space (vegetation clearance) and fire safe construction practices?**

Definition: An indication of whether fire safe measures have been established at the Campus. Click “Yes”, if the Campus has implemented fire safe initiatives.
8. **Briefly describe the safe measures implemented.**
This field will only display on the screen if “Yes” was checked for ‘Have any fire safe practices been implemented for this campus, such as establishing defensible space (vegetation clearance) and fire safe construction practices? 
Definition: Additional information describing the fire safe measures implemented.
Provide an additional description of the fire safe measures implemented at the Campus.

9. **Is there a Wildland/Urban Interface Fire emergency evacuation plan?**
Definition: An indication of whether there is a wildland/urban interface fire emergency evacuation plan.
Click “Yes”, if the Campus has a written and planned emergency evacuation plan.

**H. Landslide Screen**

There are two basic types of landslides: deep-seated landslides in which a layer or block of soil/rock moves downslope; and shallow (surficial) landslides (debris flows or mudflows) in which loose sediment, vegetation and water form a slurry which flows downslope. Deep-seated landslides generally move a relatively short distance from a few feet to a few hundred feet, although unusually large slides can move a greater distance. However, debris flows may move for hundreds of yards or even several miles down existing stream channels or gullies.

Landslides are often triggered by periods of heavy rain which result in soil saturation and high water tables or by earthquakes. However, landslides may also occur on dry sunny days for no apparent reason. There are many factors which govern the likelihood of landslides at any given location, including: slope, local geology (soil/rock types), water table level, rainfall levels, level of earthquake hazard, and liquefaction potential (lateral spreading potential).

More accurate evaluation of the level of landslide risk requires detailed evaluation of local conditions by a geotechnical engineer. A campus may have a landslide risk with the following conditions:

- Gullies, swales or channels upstream of the campus that may be subject to debris flows (shallow landslides consisting of a mix of water, sediment and vegetation, which travel considerable distances – in some cases a mile or more – from slopes).
- Buildings near localized steep slopes from cut and fill or cut only during site preparation before construction of buildings or from incised streams

If a District has Campuses with the above characteristics, and Landslide is not identified in the Statewide identified hazard analysis, then the District may want to choose to enable Landslide as a District-Identified hazard.

PDM Pilot Planning Partner Use Only
1. **Is the Campus within 500 Feet of DNR mapped Landslides?**
Definition: An indication of whether the campus is within 500 feet of the Department of Natural Resources mapped landslides.

Being near historical landslides provides an indication that a campus might be at risk from landslides, but a more accurate determination requires a site-specific evaluation by a geotechnical engineer.

This field is populated from DNR mapping data cannot be edited.

2. **Maximum Slope % in Vicinity of Campus**
Definition: The numeric value that represents the maximum slope percentage in the vicinity of the campus. Steep slopes are an indication that there may be landslide risk.

Slope is an important landslide hazard parameter, but the level of landslide hazard is not completely correlated with slope. Some steep slopes may be very stable, competent rock such as basalt and thus have low landslide hazards, while some gentle slope areas may be subject to debris flows.

This field is populated from GIS elevation data and cannot be edited.

3. **Preliminary Ranking of Possible Landslide Risk**
Definition: A classification of the preliminary ranking of possible landslide risk.

Slopes are defined as the ratio of the vertical elevation change over a given horizontal difference. For example, an elevation difference of 10 feet over 100 feet horizontal distance is a slope of 10%. Slopes provide one measure of possible landslide risk – the higher the slope the higher the likelihood that a site may have landslide risk. However, landslide risk depends on many factors: a campus near GIS-mapped high slope areas does not necessary have high landslide risk, and conversely, a campus near GIS-mapped low slope areas does not necessary have low landslide risk.

This value may be higher than indicated if any of the site-specific conditions in the below data fields apply to this campus. The preliminary ranking of possible landslide risk is based on the following slope categories:

- Slope Less Than 15%: Probably None or Very Low
- Slope 15% to 25%: Probably Low
- Slope 25% to 35%: Probably Low to Moderate
- Slope Greater Than >35%: Maybe Significant – Further Study Suggested
- No Landslide Susceptibility

This field is populated from GIS elevation data and cannot be edited.

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4. **Are there stream channels, gullies, or swales upslope from the campus that have or may have significant accumulations of sediment and vegetative debris?**

Definition: An indication of whether there are stream channels, gullies, or swales upslope from the campus are possible paths for shallow debris flows (mudflows) that may affect the campus, even in the slopes are relatively low.

Click “Yes”, if the Campus has this scenario.

5. **Describe the channels, gullies or swales and identify the location relative to the campus.**

This field will only display on the screen if “Yes” was checked for ‘Are there stream channels, gullies, or swales upslope from the campus that have or may have significant accumulations of sediment and vegetative debris?’

Definition: Wording that describes the channels, gullies or swales and identifying the location relative to the campus.

Briefly describe the channels, gullies or swales and identifying the location to campus.

6. **Are there evident slumps or historical landslide areas upslope of the campus?**

Definition: An indication of whether there are evident slumps or historical landslide areas upslope of the campus. Historic landslides may be visible as areas with a scarp at the upslope end and a bulging "toe" of material that has slid downslope.

Click “Yes”, if the Campus has this scenario.

7. **Describe the possible slumps or historical landslide areas and identify the location(s) relative to the campus.**

This field will only display on the screen if “Yes” was checked for ‘Are there evident slumps or historical landslide areas upslope of the campus?’

Definition: Wording that describes the possible slumps or historical landslide areas and identifying the location(s) relative to the campus.

Briefly describe the possible slumps or historical landslide areas and identifying the location(s) relative to the campus.

8. **Are there any Campus buildings within 50 feet of an incised stream or gully with steep sides?**

Definition: An indication of whether there is an incised stream (a stream that has cut deeply into the surrounding soil/rock, with steep banks on the stream sides, therefore the steep slides are subject to ground failures), or a gully with steep sides on or adjacent to the campus.
Click “Yes”, if the Campus has this scenario.

9. **What is the approximate elevation difference between the top of the steep slope and the bottom of the stream channel? (feet)**

This field will only display on the screen if “Yes” was checked for ‘Are there any Campus buildings within 50 feet of an incised stream or gully with steep sides?’

Definition: The number of feet of elevation difference between the top of the steep slope, the bottom of the stream channel and the approximate distance from the top of the bank to the nearest campus building.

Enter the elevation difference in total feet.

10. **What is the approximate distance from the top of the bank to the nearest Campus building? (feet)**

This field will only display on the screen if “Yes” was checked for ‘Are there any Campus buildings within 50 feet of an incised stream or gully with steep sides?’

Definition: The number of feet of distance from the top of the bank to the nearest Campus building.

Enter the distance in total feet.

11. **Are any Campus buildings within 50 feet of steep slopes from ground modifications during construction of the campus – cut and fill or fill only?**

Definition: An indication of whether the campus or part of the campus, under or near the buildings built on the site has been modified prior to construction of the buildings by cut-and-fill, or fill-only. If so, the upslope edge of the cut or the downslope edge of the fill may be subject to ground failures.

Click “Yes”, if the Campus is near this scenario.

12. **What is the approximate elevation difference between the top and bottom of the steep slope? (feet)**

This field will only display on the screen if “Yes” was checked for ‘Are any Campus buildings within 50 feet of steep slopes from ground modifications during construction of the campus – cut and fill or fill only?’

Definition: The number of feet of elevation difference between the top and bottom of the steep slope.

Enter the elevation difference in total feet.

13. **What is the approximate distance from the top of the bank to the nearest Campus building? (feet)**

This field will only display on the screen if “Yes” was checked for ‘Are any Campus buildings within 50 feet of steep slopes from ground modifications during construction of the campus – cut and fill or fill only?’
Definition: The number of feet of distance from the top of the bank to the nearest Campus building. Enter the distance in total feet.

14. During construction, was the cut-and-fill or fill-only engineered with compaction tests, stability analyses, etc.? This field will only display on the screen if “Yes” was checked for ‘Are any Campus buildings within 50 feet of steep slopes from ground modifications during construction of the campus – cut and fill or fill only?’

Definition: An indication of whether cut- and-fill or fill-only engineered during construction with compaction tests, stability analyses, etc.

Click “Yes”, if the cut-and-fill or fill-only was engineered during construction.

15. Describe how the cut-and-fill or fill-only was engineered (compaction tests, etc.) This field will only display on the screen if “Yes” was checked for ‘Was the cut and fill or fill only engineered during construction with compaction tests, stability analyses and so on?’

Definition: Wording that describes how the cut-and-fill or fill-only was engineered.

Briefly describe how the cut-and-fill or fill-only was engineered (compaction tests, etc.)

16. Is there a Landslide emergency evacuation plan?
Definition: An indication of whether there is a landslide emergency evacuation plan.

Click “Yes”, if the Campus has a written and planned emergency evacuation plan. If not, then developing an evacuation plan is recommended for the Campus.